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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,937	11/19/2001	Ralf Bohnke	450117-03690	9361

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NEW YORK, NY 10151

EXAMINER

DEAN, RAYMOND S

ART UNIT	PAPER NUMBER
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2684

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/988,937

Applicant(s)

BOHNKE ET AL.

Examiner

Raymond S Dean

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/19/2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)

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(e) BACKGROUND OF THE INVENTION.

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(f) BRIEF SUMMARY OF THE INVENTION.

(g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(h) DETAILED DESCRIPTION OF THE INVENTION.

(i) CLAIM OR CLAIMS (commencing on a separate sheet).

(j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1 – 11 and 14 – 17 are rejected under 35 U.S.C. 102(a) as being anticipated by Keller et al. (Vehicular Technology, IEEE Transactions on, Volume: 49, Issue: 5, Sept 2000, Pages: 1893 – 1906).

Regarding Claim 1, Keller teaches a wireless multicarrier transmission method, wherein subcarriers of the multicarrier transmission are modulated, characterized in that the modulation scheme on each subcarrier is selected depending on the channel transfer function on the subcarrier (Section II (A. System Model), Section II (D. Choice of the Modulation Scheme, First Paragraph)).

Regarding Claim 2, Keller teaches all of the claimed limitations recited in Claim 1. Keller further teaches the selection of the modulation scheme loading tables is calculated for the subcarriers, wherein the loading tables have respectively one entry for each subcarrier (Section II (A. System Model, Third Paragraph lines 1 – 4), Section II (D. Choice of the Modulation Scheme, First Paragraph), the set of modulation schemes is the loading table).

Regarding Claim 3, Keller teaches all of the claimed limitations recited in Claim 1. Keller further teaches the modulation scheme of subcarriers having a high power level is increased, whereas the modulation scheme of subcarriers having a poor power level is decreased departing from a default modulation scheme (Section II (D. Choice of the Modulation Scheme, Section 1, Third Paragraph lines 10 – 16), when the SNR is high the power level is high, there will thus be an increase in the number of bits per symbol and thus a corresponding increase in the modulation scheme, when the SNR is low the power level is low, there will thus be a decrease in the number of bits per symbol and thus a corresponding decrease in the modulation scheme).

Regarding Claim 4, Keller teaches all of the claimed limitations recited in Claim 1. Keller further teaches the modulation schemes of the subcarriers are adapted such that the total number of coded bits per symbol is constant (Section II (A. System Model, Second Paragraph lines 22 – 23, Third Paragraph lines 1 – 4), Section II (D. Choice of the Modulation Scheme, Section 1, Third Paragraph lines 10 – 16), Section II (F. Subband Adaptive OFDM and Channel Coding, First Paragraph lines 8 – 13), a desired SNR determines a particular BER which further determines a particular throughput or

number of bits per symbol, said throughput or number of bits per symbol corresponds to a particular modulation scheme).

Regarding Claim 5, Keller teaches all of the claimed limitations recited in Claim 1. Keller further teaches along with the adaptation of the modulation schemes the transmission power of the subcarriers are adapted such that the total transmission power of all subcarriers remains unchanged (Section II (A. System Model, Second Paragraph Equation (2))), the overall SNR γ comprises the SNRs of all of the subcarriers $\gamma_{\text{sub } n}$, said SNRs $\gamma_{\text{sub } n}$ are directly dependent on the transmission power of the subcarriers n thus when a particular overall SNR γ is desired the transmission power of said subcarriers n will be adapted to achieve said desired SNR γ).

Regarding Claim 6, Keller teaches all of the claimed limitations recited in Claim 5. Keller further teaches the transmission power of subcarriers having a higher modulation scheme is enhanced to compensate for subcarriers which are not modulated at all due to the adaptation of the modulation scheme (Section II (D. Choice of the Modulation Scheme, First Paragraph), Section II (A. System Model, Second Paragraph Equation (2))), the overall SNR γ comprises the SNRs of all of the subcarriers $\gamma_{\text{sub } n}$, said SNRs $\gamma_{\text{sub } n}$ are directly dependent on the transmission power of the subcarriers n thus when a particular overall SNR γ is desired the transmission power of said subcarriers n will be adapted to achieve said desired SNR γ , when a plurality of said subcarriers n are not modulated there will be no transmission of said subcarriers n thus the transmission power of the modulated subcarriers n will be modified to compensate for the

transmission power loss caused by the said non modulated subcarriers n such that said desired SNR γ is still achieved).

Regarding Claim 7, Keller teaches all of the claimed limitations recited in Claim 1. Keller further teaches adaptive loading information reflecting the adaptation of the modulation scheme of the subcarriers is exchanged between a transmitter and a receiver (Figure 1a, Figure 1b, Section I Paragraphs 5 and 6).

Regarding Claim 8, Keller teaches all of the claimed limitations recited in Claim 7. Keller further teaches the receiver calculates a suitable loading based on received signals, - the receiver sends the adaptive loading information in a signaling field and uses the calculated adaptive loading in the data field of a transmitted data train (Figure 1b, Section I Paragraph 5 lines 18 – 21, Section I Paragraph 6 lines 33 – 38, this is a packet based wireless system thus there will be a data train comprising data fields).

Regarding Claim 9, Keller teaches all of the claimed limitations recited in Claim 1. Keller further teaches a plurality of subcarriers is bundled into groups and the same modulation scheme is applied for all subcarriers belonging to the same group (Section II (D. Choice of Modulation Scheme, Second Paragraph lines 1 – 6)).

Regarding Claim 10, Keller teaches all of the claimed limitations recited in Claim 1. Keller further teaches a plurality of adjacent subcarriers is bundled into one group (Section II (D. Choice of Modulation Scheme, Second Paragraph lines 1 – 6)).

Regarding Claim 11, Keller teaches all of the claimed limitations recited in Claim 1. Keller further teaches a computer software product that implements the method of Claim 1 when run on a computing device of a wireless transmitting device (Figure 1a,

Figure 1b, Section I Paragraphs 5 and 6, this shows a mobile station and base station configured to employ the AOFDM algorithm, a mobile station comprises wireless transmitting devices such as wireless phones and mobile computers, said phones/computers comprise CPUs that control the operation of said phones/computers, there is software that runs on board said CPUs that enable said CPUs to carry out the required functions, the mobile stations of the AOFDM system will therefore comprise CPUs with on board software that enables said CPUs to run the said AOFDM algorithm).

Regarding Claim 14, Keller teaches a wireless multicarrier transmission device, comprising a modulator for modulating subcarriers of the multicarrier transmission (Figure 1a, Section II (D. Choice of the Modulation Scheme, First Paragraph), the subcarriers are modulated thus there will be a modulator), characterized by an adaptive loading calculation unit selecting the modulation scheme on each subcarrier depending on supplied channel transfer function information on the subcarrier (Section II (A. System Model), Section II (D. Choice of the Modulation Scheme, First Paragraph), there is a modulation scheme selected for each subcarrier thus there is an adaptive loading calculation unit for the selecting of said modulation scheme).

Regarding Claim 15, Keller teaches all of the claimed limitations recited in Claim 14. Keller further teaches the adaptive loading calculation unit calculates adaptive loading tables for the subcarriers, wherein the loading tables have respectively one entry for each subcarrier (Section II (A. System Model, Third Paragraph lines 1 – 4),

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Section II (D. Choice of the Modulation Scheme, First Paragraph), the set of modulation schemes is the loading table).

Regarding Claim 16, Keller teaches all of the claimed limitations recited in Claim 14. Keller further teaches the adaptive loading calculation unit bundles respectively a plurality of subcarriers into groups and applies the same modulation scheme on all subcarriers belonging to the same group (Section II (D. Choice of Modulation Scheme, Second Paragraph lines 1 – 6)).

Regarding Claim 17, Keller teaches all of the claimed limitations recited in Claim 16. Keller further teaches the adaptive loading calculation unit (8) bundles a plurality of adjacent subcarriers into one group (Section II (D. Choice of Modulation Scheme, Second Paragraph lines 1 – 6)).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keller et al. (Vehicular Technology, IEEE Transactions on, Volume: 49, Issue: 5, Sept 2000, Pages: 1893 – 1906) in view of Lindskog et al. (US 2001/0031626).

Regarding Claim 12, Keller teaches a data train for a wireless multicarrier transmission having subcarriers which are adaptively modulated (Section I Paragraph 5 lines 18 – 21, Section II (A. System Model, Third Paragraph lines 1 – 4), this is a packet based wireless system thus there will be a data train comprising data fields).

Keller does not specifically teach wherein the data train comprises at least one traffic data field (LCH) as well as at least one adaptive modulation information field (SCH) reflecting the modulation scheme of the subcarriers used for the traffic data field (LCH).

Lindskog teaches a traffic data field (LCH) as well as at least one modulation information field (SCH) (Section 0015 lines 17 – 22, controlling of the signaling comprises modulation thus there will be a modulation information field).

Keller (Section II (B. Channel Model, lines 9 – 12) and Lindskog (Sections 0011 – 0013) both teach a wireless LAN thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the LCH and SCH taught by Lindskog in the wireless LAN of Keller for the purposes of signaling user data, signaling control data and feedback signaling of the user data reception status (Automatic Repeat Request) as taught by Lindskog.

Regarding Claim 13, Keller in view of Lindskog teaches all of the claimed limitations recited in Claim 12. Keller further teaches a plurality of subcarriers having the same modulation scheme is bundled into a group (Section II (D. Choice of Modulation Scheme, Second Paragraph lines 1 – 6)). Lindskog further teaches the modulation information field (SCH) contains information regarding the modulation

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scheme (Section 0015 lines 17 – 22, controlling of the signaling comprises modulation thus there will be a modulation information field).


Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond S Dean whose telephone number is 703-305-8998. The examiner can normally be reached on 7:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay A Maung can be reached on 703-308-7745. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


NICK CORSARO
PRIMARY EXAMINER


Raymond S. Dean
August 11, 2004